

10.10: Rationalizing a Denominator Containing a radical.

Recall: We can not have an irrational number (radical) in the denominator.

Defn: To rationalize the denominator of a fraction means to find an equivalent fraction where the denominator is rational.

$$\text{Ex: } \frac{2\sqrt{5}}{\sqrt{5} \cdot \sqrt{5}} = \frac{2\sqrt{5}}{\sqrt{25}} = \frac{2\sqrt{5}}{5} = \frac{10\sqrt{5}}{5}$$

Rationalizing Monomial Denominators:

1) (x) denominator and numerator by another radical that results in a perfect denom.

2) Simplify

$$\begin{aligned} \text{Ex: } \frac{10}{\sqrt{8}} \cdot \frac{\sqrt{2}}{\sqrt{2}} &= \frac{10\sqrt{2}}{\sqrt{16}} = \frac{10\sqrt{2}}{4} \\ &= \frac{5\sqrt{2}}{2} \text{ or } \frac{5}{2}\sqrt{2} \end{aligned}$$

$$\text{Ex: } \frac{(3\sqrt{5} - \sqrt{3})\sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{3\sqrt{15} - \sqrt{9}}{\sqrt{9}}$$

$$= \frac{3\sqrt{15} - 3}{3}$$

$$= \frac{3\sqrt{15}}{3} - \frac{3}{3}$$

$$= \sqrt{15} - 1$$

Chapter 10.pdf - Adobe Reader
File Edit View Window Help
43 / 56 147%
Answer: (3)

EXERCISES WITH OPEN-RESPONSE PROBLEMS

In 1–45, rationalize the denominator of each fraction. If possible, simplify the result.

1. $\frac{1}{\sqrt{7}}$	2. $\frac{9}{\sqrt{2}}$	3. $\frac{8}{\sqrt{5}}$	4. $\frac{15}{\sqrt{10}}$	5. $\frac{3}{\sqrt{6}}$
6. $\frac{6}{\sqrt{3}}$	7. $\frac{4}{\sqrt{18}}$	8. $\frac{6}{\sqrt{8}}$	9. $\frac{15}{\sqrt{50}}$	10. $\frac{6}{\sqrt{27}}$
11. $\frac{4}{\sqrt{48}}$	12. $\frac{3}{2\sqrt{2}}$	13. $\frac{3}{2\sqrt{3}}$	14. $\frac{9}{4\sqrt{6}}$	15. $\frac{10}{3\sqrt{20}}$
16. $\frac{5\sqrt{2}}{\sqrt{5}}$	17. $\frac{\sqrt{6}}{4\sqrt{2}}$	18. $\frac{3\sqrt{8}}{4\sqrt{18}}$	19. $\frac{2}{\sqrt[3]{16}}$	20. $\frac{4\sqrt[3]{3}}{3\sqrt[3]{2}}$
21. $\frac{5}{2 - \sqrt{3}}$	22. $\frac{4}{3 + \sqrt{2}}$	23. $\frac{1}{4 + \sqrt{5}}$	24. $\frac{5}{4 + \sqrt{6}}$	25. $\frac{6}{4 - \sqrt{10}}$
26. $\frac{9}{5 - \sqrt{13}}$	27. $\frac{6}{\sqrt{7} + 2}$	28. $\frac{4}{\sqrt{15} - 3}$	29. $\frac{4}{\sqrt{5} - 3}$	30. $\frac{11}{\sqrt{3} - 5}$
31. $\frac{12}{\sqrt{17} + 5}$	32. $\frac{\sqrt{7}}{3 - \sqrt{7}}$	33. $\frac{\sqrt{3}}{\sqrt{3} + 1}$	34. $\frac{2\sqrt{5}}{\sqrt{5} - 1}$	35. $\frac{\sqrt{2}}{2 - \sqrt{2}}$
36. $\frac{2 + \sqrt{3}}{4 - \sqrt{3}}$	37. $\frac{6 - \sqrt{7}}{5 - \sqrt{7}}$	38. $\frac{1 + \sqrt{11}}{4 - \sqrt{11}}$	39. $\frac{1 + \sqrt{5}}{3 - \sqrt{5}}$	40. $\frac{1 + \sqrt{3}}{3 - \sqrt{3}}$
41. $\frac{1 + \sqrt{5}}{5 + \sqrt{5}}$	42. $\frac{\sqrt{10} - 3}{\sqrt{10} - 2}$	43. $\frac{\sqrt{7} + \sqrt{3}}{\sqrt{7} - \sqrt{3}}$	44. $\frac{5\sqrt{2} + 1}{2\sqrt{2} - 1}$	45. $\frac{\sqrt{12} - 2}{\sqrt{3} - 1}$

Pg 421:
2-20
evens

In 46–53, in each case: a. Use a calculator to find an approximate value of the given fraction to the

$$\begin{aligned}
 20. \quad & \frac{4\sqrt[3]{3}}{3\sqrt[3]{2}} \cdot \frac{\sqrt[3]{4}}{\sqrt[3]{4}} = \frac{4\sqrt[3]{12}}{3\sqrt[3]{8}} = \frac{4\sqrt[3]{12}}{6} \\
 & = \frac{2\sqrt[3]{12}}{3} \quad \text{or} \quad \frac{2\sqrt[3]{12}}{3}
 \end{aligned}$$